AMENDED CLAIMS
[received by the International Bureau on 18 November 2004 (18.11.04);
original claims 1-51 replaced by new claims 1-58 (11 pages)]

CLAIMS

1.   A method of supporting Hierarchical Mobile IP version 6 (HMIPv6) service
for a mobile node, characterized by using an AAA infrastructure to bootstrap the
5   HMIPv6 service including:
     said AAA infrastructure assigning an appropriate Mobility Anchor Point (MAP)
to the mobile node for the HMIPv6 service; and
     transferring HMIPv6-related information required for authenticating and
authorizing the mobile node for the HMIPv6 service with the assigned MAP over said
10   AAA infrastructure.

2.   The method of claim 1, characterized in that an AAA server of said AAA
infrastructure assigns an appropriate MAP to the mobile node for the HMIPv6 service.

15   3.   The method of claim 2, characterized in that the mobile node is roaming in a
visited network, and an AAA visited network server (AAAv) assigns a MAP in the
visited network to the mobile node.

4.   The method of claim 3, characterized in that the AAAv assigns a MAP based
20   on a policy of the visited network operator.

5.   The method of claim 3, characterized in that the mobile node sends a MAP
assignment request to an AAA home network server (AAAh) over the AAA
infrastructure, and the AAAh forwards the MAP assignment request to the AAA
25   visited network server (AAAv), and the AAA home network server generates
credential-related data for security association between the mobile node and the
assigned MAP, said credential-related data being transferred from the AAAh to the
MAP via the AAAv, the AAAh generates information for finalizing the security
association or the MAP responds with information for finalizing the security
30   association to the AAAh via the AAAv, and the AAAh sends HMIPv6 authorization

information including MAP assignment information, binding address information and security association information to the mobile node over the AAA infrastructure.

6. The method of claim 2, characterized in that an AAA home network server (AAAh) assigns a MAP in the home network to the mobile node.

7. The method of claim 6, characterized in that the AAA home network server (AAAh) generates credential-related data for security association between the mobile node and the assigned MAP and sends said credential-related data to the MAP, the AAAh generates information for finalizing the security association or the MAP responds with information for finalizing the security association to the AAAh, and the AAAh sends HMIPv6 authorization information including MAP assignment information, binding address information and security association information to the mobile node over the AAA infrastructure.

8. The method of claim 1, characterized in that an AAA infrastructure component of the home network generates credential-related data for security association between the mobile node and the assigned MAP and sends said credential-related data to the MAP, the AAA infrastructure home network component generates information for finalizing the security association or the MAP responds with information for finalizing the security association to the AAA infrastructure home network component, which sends HMIPv6 authorization information to the mobile node over the AAA infrastructure.

9. The method of claim 1, characterized in that said HMIPv6-related information comprises HMIPv6 authentication, authorization and configuration information.

10. The method of claim 1, characterized by transferring HMIPv6-related information over said AAA infrastructure for establishing a HMIPv6 security association between the mobile node and the assigned MAP.

5 11. The method of claim 10, characterized by transferring HMIPv6-related information over said AAA infrastructure for establishing a HMIPv6 binding for the mobile node.

12. The method of claim 11, characterized by transferring HMIPv6-related
10 information for HMIPv6 binding in the same round trip as HMIPv6-related information for HMIPv6 security association.

13. The method of claim 1, characterized in that the mobile node is roaming in a visited network, and HMIPv6-related authentication and authorization information is
15 transferred between the mobile node and an AAA home network server (AAAh) within an authentication protocol in an end-to-end procedure transparent to the visited network.

14. The method of claim 13, characterized in that said authentication protocol is
20 an extended authentication protocol.

15. The method of claim 14, characterized in that said extended authentication protocol is an extended Extensible Authentication Protocol (EAP), and said HMIPv6-related information is incorporated as additional data in the EAP protocol stack.

25 16. The method of claim 15, characterized in that said HMIPv6-related information is transferred as EAP attributes in the EAP method layer of the EAP protocol stack.

17. The method of claim 15, characterized in that said HMIPv6-related information is transferred in a generic container in the EAP protocol stack.

18. The method of claim 15, characterized in that the extended EAP protocol is carried by PANA, PPP or IEEE 802.1X between the mobile node and an AAA client in the visited network, and by Diameter or Radius within the AAA infrastructure.

19. The method of claim 1, characterized in that the assigned MAP is located in the home network of the mobile node, and HMIPv6-related information is transferred between the mobile node and an AAA home network server (AAAh) within an authentication protocol, and HMIPv6-related information is transferred between the AAAh and the assigned MAP in a separate session of the authentication protocol or within an AAA framework protocol application.

20. The method of claim 13, characterized in that the assigned MAP is located in the visited network, and HMIPv6-related information is transferred between the mobile node and the AAA home network server (AAAh) within said authentication protocol, and HMIPv6-related information is transferred between the AAAh and the assigned MAP in the visited network within an AAA framework protocol application.

21. The method of claim 20, characterized in that said AAA framework protocol application is a Diameter or Radius application adapted for HMIPv6.

22. The method of claim 1, characterized in that said HMIPv6-related information is transferred in an AAA framework protocol application over said AAA infrastructure.

23. The method of claim 22, characterized in that said AAA framework protocol application is a Diameter or Radius application adapted for HMIPv6.

AMENDED SHEET (ARTICLE 19)

24. The method of claim 1, characterized by simultaneously accommodating HMIPv6 and MIPv6 authentication and authorization in the same round trip over said AAA infrastructure.

5   25. A system for supporting Hierarchical Mobile IP version 6 (HMIPv6) service for a mobile node, characterized by:

an AAA infrastructure component operable for assigning an appropriate Mobility Anchor Point (MAP) to the mobile node for the HMIPv6 service; and

means for transferring HMIPv6-related information required for authenticating

10   and authorizing the mobile node for the HMIPv6 service with the assigned MAP over said AAA infrastructure.

26. The system of claim 25, characterized in that said AAA infrastructure component is an AAA server that is operable for assigning an appropriate MAP to the

15   mobile node for the HMIPv6 service.

27. The system of claim 26, characterized in that the mobile node is roaming in a visited network, and an AAA visited network server (AAAv) is operable for assigning a MAP in the visited network to the mobile node.

20

28. The system of claim 27, characterized in that the AAAv is operable for assigning a MAP based on a policy of the visited network operator.

29. The system of claim 27, characterized in that an AAA home network server

25   (AAAh) comprises:

means for forwarding a MAP assignment request received over said AAA infrastructure from the mobile node to the AAA visited network server (AAAv);

means for generating credential-related data for security association between the mobile node and the assigned MAP;

AMENDED SHEET (ARTICLE 19)

means for sending said credential-related data to the assigned MAP via the AAAv;

means for receiving, from the MAP via the AAAv, information for finalizing the security association and binding address information; and

5 means for sending HMIPv6 authorization information including MAP assignment information, binding address information and security association information to the mobile node over the AAA infrastructure.

30. The system of claim 26, characterized in that an AAA home network server

10 (AAAh) is operable for assigning a MAP in the home network to the mobile node.

31. The system of claim 30, characterized in that the AAA home network server (AAAh) comprises:

means for generating credential-related data for security association between

15 the mobile node and the assigned MAP;

means for sending said credential-related data to the assigned MAP;

means for receiving information from the MAP for finalizing the security association and binding address information;

means for sending HMIPv6 authorization information including MAP

20 assignment information, binding address information and security association information to the mobile node over the AAA infrastructure.

32. The system of claim 25, characterized in that an AAA infrastructure component of the home network comprises:

25 means for generating credential-related data for security association between the mobile node and the assigned MAP; and

means for sending said credential-related data to the assigned MAP;

means for receiving information from the MAP for finalizing the security association; and

means for sending HMIPv6 authorization information to the mobile node over the AAA infrastructure.

33. The system of claim 25, characterized in that said HMIPv6-related

5   information comprises HMIPv6 authentication, authorization and configuration information.

34. The system of claim 25, characterized by means for transferring HMIPv6-related information over said AAA infrastructure for establishing a HMIPv6 security

10   association between the mobile node and the assigned MAP.

35. The system of claim 34, characterized by means for transferring HMIPv6-related information over said AAA infrastructure for establishing a HMIPv6 binding for the mobile node.

15

36. The system of claim 35, characterized by means for transferring HMIPv6-related information for HMIPv6 binding in the same round trip as HMIPv6-related information for HMIPv6 security association.

20   37. The system of claim 25, characterized in that the mobile node is roaming in a visited network, and HMIPv6-related authentication and authorization information is transferred between the mobile node and an AAA home network server (AAAh) within an authentication protocol in an end-to-end procedure transparent to the visited network.

25

38. The system of claim 37, characterized in that said authentication protocol is an extended authentication protocol.

39. The system of claim 38, characterized in that said extended authentication protocol is an extended Extensible Authentication Protocol (EAP), and said HMIPv6-related information is incorporated as additional data in the EAP protocol stack.

5   40. The system of claim 39, characterized in that said HMIPv6-related information is transferred as EAP attributes in the EAP method layer of the EAP protocol stack.

41. The system of claim 39, characterized in that said HMIPv6-related
10   information is transferred in a generic container in the EAP protocol stack.

42. The system of claim 39, characterized in that the extended EAP protocol is carried by PANA, PPP or IEEE 802.1X between the mobile node and an AAA client in the visited network, and by Diameter or Radius within the AAA infrastructure.

15

43. The system of claim 25, characterized in that the assigned MAP is located in the home network, and HMIPv6-related information is transferred between the mobile node and an AAA home network server (AAAh) within an authentication protocol, and HMIPv6-related information is transferred between the AAAh and the MAP in a
20   separate session of the authentication protocol or within an AAA framework protocol application.

44. The system of claim 37, characterized in that the assigned MAP is located in the visited network, and HMIPv6-related information is transferred between the
25   mobile node and an AAA home network server (AAAh) within said authentication protocol, and HMIPv6-related information is transferred between the AAAh and the assigned MAP in the visited network within an AAA framework protocol application.

45. The system of claim 44, characterized in that said AAA framework protocol
30   application is a Diameter or Radius application adapted for HMIPv6.

AMENDED SHEET (ARTICLE 19)

46. The system of claim 25, characterized in that said HMIPv6-related information is transferred in an AAA framework protocol application over said AAA infrastructure.

5   47. The system of claim 46, characterized in that said AAA framework protocol application is a Diameter or Radius application adapted for HMIPv6.

48. The system of claim 25, characterized by means for simultaneously accommodating HMIPv6 and MIPv6 authentication and authorization in the same

10   round trip over said AAA infrastructure.

49. An AAA server for supporting Hierarchical Mobile IP version 6 (HMIPv6) service for a mobile node, characterized by means for assigning an appropriate Mobility Anchor Point (MAP) to the mobile node for the HMIPv6 service.

15

50. The AAA server of claim 49, characterized in that the mobile node is roaming in a visited network, and said AAA server is an AAA visited network server (AAAv) operable for assigning a MAP in the visited network.

20   51. The AAA server of claim 50, characterized in that said AAAv is operable for assigning a MAP based on a policy of the visited network operator.

52. The AAA server of claim 49, characterized in that said AAA server is an AAA home network server (AAAh) operable for assigning a MAP in the home

25   network of the mobile node.

53. The AAA server of claim 49, characterized in that said MAP assigning means operates in response to a MAP assignment request initiated from the mobile node.

54. The AAA server of claim 49, characterized in that said MAP assigning means is operable for performing network-initiated MAP assignment.

55. An AAA home network server (AAAh) for supporting Hierarchical Mobile IP version 6 (HMIPv6) service for a mobile node, characterized by:

means for generating credential-related data for security association between the mobile node and a Mobility Anchor Point (MAP) assigned by an AAA infrastructure component; and

means for sending said credential-related data to the assigned MAP;

means for receiving information from the MAP for finalizing the security association; and

means for sending HMIPv6 authorization information including security association information to the mobile node.

56. The AAA home network server of claim 55, characterized in that said mobile node is roaming in a visited network, and said means for sending HMIPv6 authorization information is operable for sending the information over an AAA infrastructure linking the visited network with the home network of the mobile node.

57. The AAA home network server of claim 56, characterized in that said AAA home network server is configured for receiving, from the assigned MAP, information for finalizing the security association as well as binding address information, and said means for sending HMIPv6 authorization information over the AAA infrastructure is configured for sending HMIPv6 authorization information including MAP assignment information, binding address information and security association information to the mobile node.

58. A system for supporting Hierarchical Mobile IP version 6 (HMIPv6) service for a mobile node, characterized by means for transferring HMIPv6-related authentication and authorization information in an Extensible Authentication Protocol

(EAP) between the mobile node and an AAA home network server over an AAA infrastructure for authenticating and authorizing the mobile node for HMIPv6 service, said HMIPv6-related information being incorporated as additional data in the EAP protocol stack.

5